PC B Investigating Tangent

Name _____

Per. ____ Team ____

Consider $\tan x = \frac{\sin x}{\cos x}$

On $[-2\pi, 2\pi]$, where will $\tan x$ be undefined? _____

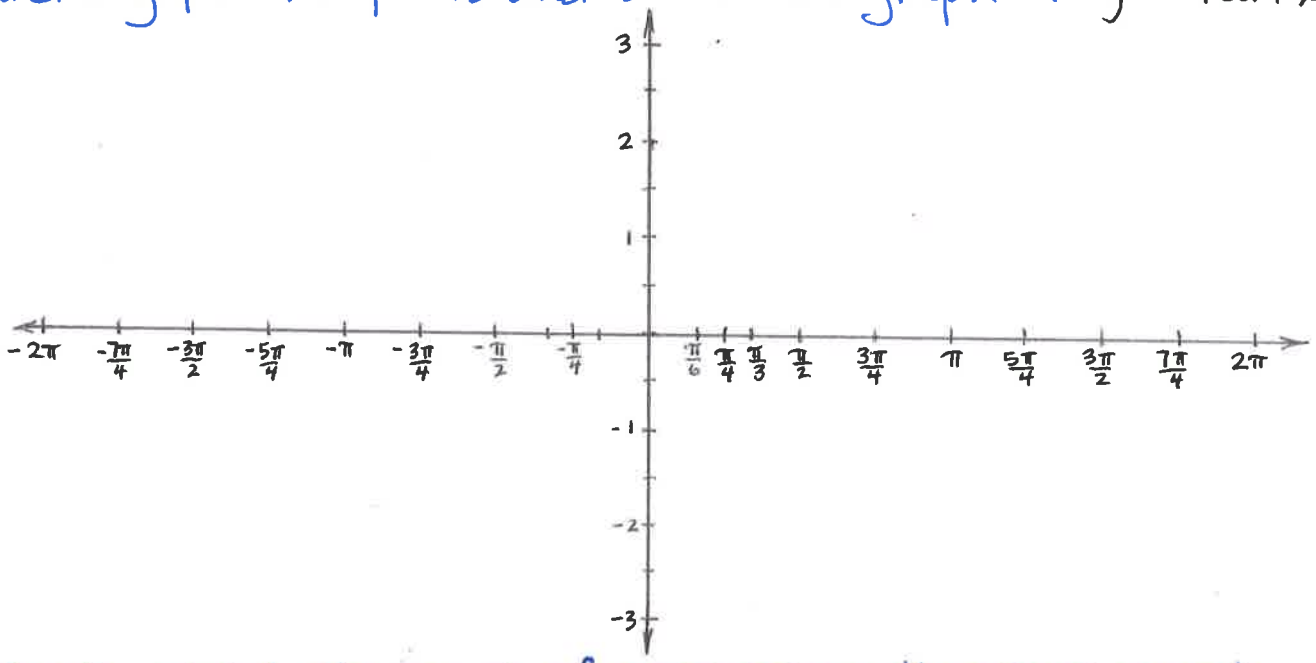
Where will $\tan x = 0$? _____

What would you expect to see on the graph of $y = \tan x$ at these locations?

Use your unit circle and make a few calculations to fill in the table:

x	$-\frac{3\pi}{2}$	$-\frac{5\pi}{4}$	$-\pi$	$-\frac{3\pi}{4}$	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{4}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$\tan x$ exact																			
$\tan x$ nearest tenth																			

Carefully plot the points and sketch the graph of $y = \tan x$



Lightly sketch the graph of $y = \cos x$ on the same graph above. Compare the graphs: How are they similar? How are they different? Compare the graphs where $\cos x = 0$.

Properties of the tangent: (Describe what you see on your graph)

Domain:

Range:

Where are x-intercepts located?

Where are asymptotes located?

Any symmetry?

How long before its pattern repeats?

Homework: (Attach on a separate sheet of paper)

Decribe the transformations of $y=\sin x$, $y=\cos x$, or $y=\tan x$ for each function and state period, amplitude, line of oscillation, location of asymptotes where appropriate.

1. $y = 3\sin\left(x - \frac{\pi}{6}\right)$

2. $y = 2 + \cos\left(2x + \frac{\pi}{2}\right)$

3. $y = -5\cos x + 7$

4. $y = -3 + \frac{1}{2}\sin(6\pi - 2x)$

5. $y = 6 + \tan\left(x - \frac{\pi}{4}\right)$

6. $y = -\tan x$

7. $y = 1 + \sin(\pi x - 3\pi)$

8. $y = -2 + \sin\left(\frac{\pi}{2} - x\right)$

Sketch the following graphs. Make sure your scale on both axes is clearly labeled for 2 cycles.

9. $y = 3\sin x - 1$

10. $y = -\tan x$

11. $y = 3 - \cos\left(x + \frac{\pi}{4}\right)$

12. $y = 1 + \sin(x + \pi)$

13. $y = -2\sin(\pi x)$

14. $y = 3\cos(-2x)$